DECODE X | 2026

03 – Case MOBILITY SHIFT

Stage 1 – Baseline Network Diagnostics & Growth-Aware Forecasting

28 February 2026 | 11:00 AM

1. **Executive Context**

   Dubai RTA manages a multi-corridor bus network serving:

   - CBD corridors (Downtown, Business Bay, Deira)
   - Coastal tourism belt (Marina)
   - Residential zones (Al Qusais, International City)
   - Industrial corridor (Jebel Ali)

   Between 2022 and mid-2025:

   - Urban population expanded steadily
   - Tourism exhibited strong seasonal variation
   - Road congestion intensified gradually
   - Corridor-level demand divergence increased

The Board mandate:

"Align demand, corridor efficiency, and fleet allocation under accelerating urban growth."

This is no longer a capacity estimation problem.

It is a system efficiency and allocation optimization problem under growth and congestion pressure.

2. **Operating Environment Characteristics**

   A. Demand Environment

   - Winter uplift (Nov–Mar)
   - Summer moderation (Jun–Aug)
   - Event-driven mobility shifts
   - Weekday/weekend divergence
   - Non-uniform corridor growth

   B. Network Structure

   Routes categorized as:

   - City
   - Express
   - Feeder
   - Intercity

   Stop-level demand varies by:

   - Urban Zone
   - Route Type
   - Day Type
   - Congestion Level

C. Congestion Interaction

Congestion affects:

- Average speed
- Effective capacity
- Load redistribution
- Reliability

Full stationarity must not be assumed.

3. Data Provided

A. Network Structure

- Bus_Routes.csv
- Bus_Stops.csv
- Route_Stop_Mapping.csv

B. Ridership Data (Training)

- Train_Ridership_2022_to_2025H1.csv

Derived metric (recommended): [Total_Pax = Boarding_Count + Alighting_Count]

C. Traffic Data

- Train_Traffic_2022_to_2025H1.csv

Datasets must be merged using:

- Route_ID
- Stop_ID
- Date

Incorrect relational merging may materially distort corridor analysis.

4. Advisory Mandate

You must:

1. Diagnose multi-year demand dynamics (2022–H1 2025).
2. Detect seasonality and weekday/weekend divergence.
3. Identify corridor-level structural imbalance.
4. Model congestion–demand interaction.
5. Forecast route-level daily demand for: **July 1 – December 31, 2025.**
   a) Identify:
      - Overload risk corridors
      - Underutilized capacity
      - Emerging imbalance
   b) Propose operational adjustments:
      - Fleet reallocation
      - Headway modification
      - Corridor prioritization

5. Stage 1 Expectations

By 7:00 PM, you should have:

- Growth decomposition
- Seasonal insight
- Route-type comparison
- Congestion elasticity understanding
- Baseline forecast
- Initial allocation strategy

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Stage 2 – Structural Break: Metro Phase 2 Introduction

28 February 2026 | 7:00 PM

1. **Structural Regime Shift**

   Metro Phase 2 commenced July 1, 2025.

   Parallel impact corridors include:

   - CBD_Downtown
   - CBD_BusinessBay
   - Core_Deira
   - Select residential corridors

   System effects observed:

   - Feeder contraction
   - Express redistribution
   - CBD overlap reduction
   - Congestion redistribution

   This represents a structural break.

2. **New Data Released**
   - Shock_Ridership_2025_Q3.csv
   - Shock_Traffic_2025_Q3.csv

   Covering July 1 – September 30, 2025.

   This period was not included in Stage 1 modeling.

3. **Stage 2 Mandate**

   You must:

   A. Detect Structural Break

   Quantify:

   - Stage 1 forecast vs Q3 actual deviation
   - Route-level divergence magnitude
   - Shift classification:
     - Level shift
     - Volatility shift
     - Elasticity shift
     - Congestion-mediated shift

B. Recalibrate Forecast

Using:

- 2022–H1 2025
- Q3 2025

Produce revised forecasts for:

October 1 – December 31, 2025

Explicitly state:

- Temporary shock vs regime change
- Elasticity adjustment logic
- Uncertainty revision

C. Operational Risk Reassessment

Identify:

- Overload corridors
- Underutilized routes
- Feeder viability
- Express sustainability

D. Fleet Reallocation Strategy

Propose:

- Headway revisions
- Fleet redeployment
- Corridor rationalization
- Volatility buffer approach

Quantify:

- Passenger redistribution
- Efficiency impact
- Congestion interaction